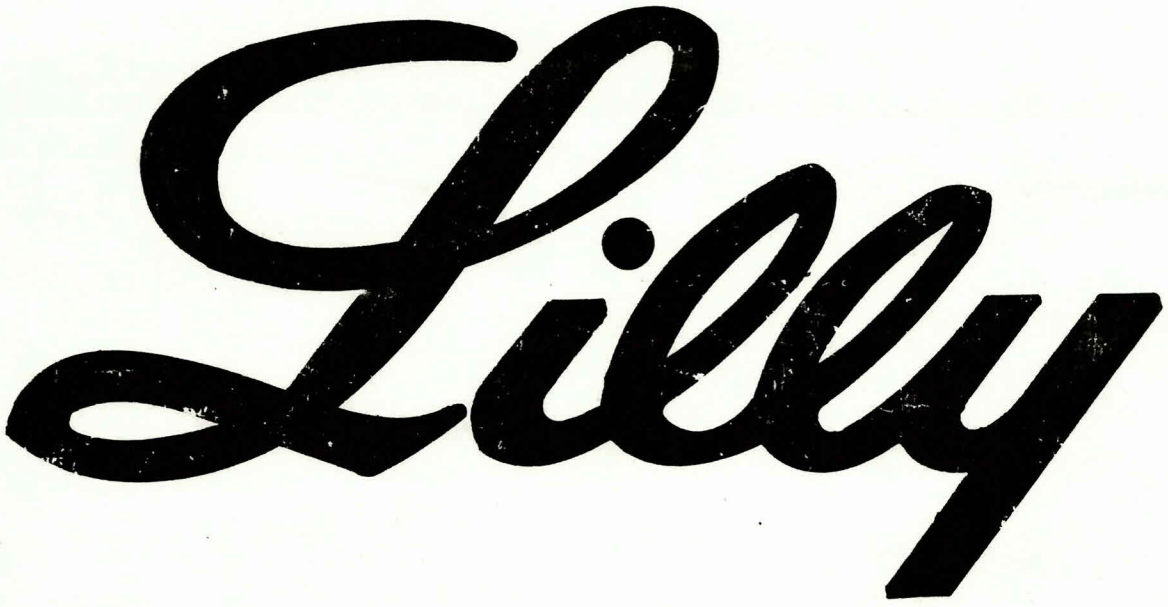
51.2-2

2B1 315
51. ~~335~~
~~50~~.1,3,3
ELI LILLY

ELI LILLY INDUSTRIES, INC
MAYAGUEZ, PUERTO RICO



RESOURCE CONSERVATION AND RECOVERY ACT
PART B APPLICATION

March 15, 1987

ELI LILLY INDUSTRIES, INC.

MAYAGUEZ

RCRA PART B PERMIT APPLICATION

GENERAL TABLE OF CONTENTS

ELI LILLY INDUSTRIES, INC.

MAYAGUEZ

RCRA PART B PERMIT APPLICATION

LIST OF FIGURES

SECTION A

PART A PERMIT APPLICATION

GENERAL INFORMATION

Consolidated Permits Program

(Read the "General Instructions" before starting.)

EPA I.D. NUMBER: F P R D 0 9 1 0 2 4 7 8 6

GENERAL INSTRUCTIONS

If a preprinted label has been provided, affix it in the designated space. Review the information carefully; if any of it is incorrect, cross through it and enter the correct data in the appropriate fill-in area below. Also, if any of the preprinted data is absent (the area to the left of the label space lists the information that should appear), please provide it in the proper fill-in area(s) below. If the label is complete and correct, you need not complete items I, III, V, and VI (except VI-B which must be completed regardless). Complete all items if no label has been provided. Refer to the instructions for detailed item descriptions and for the legal authorizations under which this data is collected.

LABEL ITEMS

I.D. NUMBER

FACILITY NAME

FACILITY MAILING ADDRESS

FACILITY LOCATION

PLEASE PLACE LABEL IN THIS SPACE

ELI LILLY INDUSTRIES, INC.
MAYAGUEZ, PUERTO RICO 00709

I. POLLUTANT CHARACTERISTICS

INSTRUCTIONS: Complete A through J to determine whether you need to submit any permit application forms to the EPA. If you answer "yes" to any questions, you must submit this form and the supplemental form listed in the parenthesis following the question. Mark "X" in the box in the third column if the supplemental form is attached. If you answer "no" to each question, you need not submit any of these forms. You may answer "no" if your activity is excluded from permit requirements; see Section C of the instructions. See also, Section D of the instructions for definitions of bold-faced terms.

SPECIFIC QUESTIONS	MARK 'X' YES	NO	FORM ATTACHED
A. Is this facility a publicly owned treatment works which results in a discharge to waters of the U.S.? (FORM 2A)		X	
B. Does or will this facility (either existing or proposed) include a concentrated animal feeding operation or aquatic animal production facility which results in a discharge to waters of the U.S.? (FORM 2B)		X	
C. Is this a facility which currently results in discharges to waters of the U.S. other than those described in A or B above? (FORM 2C)	X		
D. Is this a proposed facility (other than those described in A or B above) which will result in a discharge to waters of the U.S.? (FORM 2D)			
E. Does or will this facility treat, store, or dispose of hazardous wastes? (FORM 3)	X		X
F. Do you or will you inject at this facility industrial or municipal effluent below the lowermost stratum containing, within one quarter mile of the well bore, underground sources of drinking water? (FORM 4)		X	
G. Do you or will you inject at this facility any produced water or other fluids which are brought to the surface in connection with conventional oil or natural gas production, inject fluids used for enhanced recovery of oil or natural gas, or inject fluids for storage of liquid hydrocarbons? (FORM 4)		X	
H. Do you or will you inject at this facility fluids for special processes such as mining of sulfur by the Frasch process, solution mining of minerals, in situ combustion of fossil fuel, or recovery of geothermal energy? (FORM 4)		X	
I. Is this facility a proposed stationary source which is ONE of the 28 industrial categories listed in the instructions and which will potentially emit 100 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an attainment area? (FORM 5)		X	
J. Is this facility a proposed stationary source which is NOT one of the 28 industrial categories listed in the instructions and which will potentially emit 250 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an attainment area? (FORM 5)		X	

II. NAME OF FACILITY

SKIP: ELI LILLY INDUSTRIES INC. MAYAGUEZ

III. FACILITY CONTACT

A. NAME & TITLE (last, first, & title): VERA JOSE JUAN ENG. MANAGER

B. PHONE (area code & no.): 809 834 7846

IV. FACILITY MAILING ADDRESS

A. STREET OR P.O. BOX: P.O. BOX 1748 RD NO 2 KM 146.7

B. CITY OR TOWN: MAYAGUEZ

C. STATE: PR

D. ZIP CODE: 00709

V. FACILITY LOCATION

A. STREET, ROUTE NO. OR OTHER SPECIFIC IDENTIFIER: ROAD NO 2 KM 146.7

B. COUNTY NAME: SABANETAS

C. CITY OR TOWN: MAYAGUEZ

D. STATE: PR

E. ZIP CODE: 00709

F. COUNTY CODE (if known):

CONTINUE ON REVERS

SIC CODES (4-digit, in order of priority)

A. FIRST: (specify) MEDICINAL CHEMICALS

B. SECOND: (specify)

C. THIRD: (specify)

D. FOURTH: (specify)

III. OPERATOR INFORMATION

A. NAME: ELI LILLY INDUSTRIES, INC.

B. Is the name listed in Item VIII-A also the owner? [X] YES [ ] NO

C. STATUS OF OPERATOR (Enter the appropriate letter into the answer box; if "Other", specify.) F = FEDERAL, S = STATE, P = PRIVATE, M = PUBLIC (other than federal or state), O = OTHER (specify)

(specify)

D. PHONE (area code & no.): A 809 834 7846

E. STREET OR P.O. BOX: KM 146.7 RD NO 2 BOX 1748

F. CITY OR TOWN: MAYAGUEZ

G. STATE: PR

H. ZIP CODE: 00709

IX. INDIAN LAND: Is the facility located on Indian lands? [ ] YES [X] NO

V. EXISTING ENVIRONMENTAL PERMITS

A. NPDES (Discharges to Surface Water): PR0000353

B. UIC (Underground Injection of Fluids):

C. RCRA (Hazardous Wastes):

D. PSD (Air Emissions from Proposed Sources):

E. OTHER (specify):

(specify)

(specify)

VI. MAP

Attach to this application a topographic map of the area extending to at least one mile beyond property boundaries. The map must show the outline of the facility, the location of each of its existing and proposed intake and discharge structures, each of its hazardous waste treatment, storage, or disposal facilities, and each well where it injects fluids underground. Include all springs, rivers and other surface water bodies in the map area. See instructions for precise requirements.

VII. NATURE OF BUSINESS (provide a brief description)

Inorganic and Organic chemicals are used to produce pharmaceutical products such as: Darvon, Ilosone, Acetohexamide and Cephalexin. The raw materials are passed through chemical reactions, distillation extractions, separations and drying processes to produce intermediates and final products.

VIII. CERTIFICATION (see instructions)

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attachments and that, based on my inquiry of those persons immediately responsible for obtaining the information contained in the application, I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

A. NAME & OFFICIAL TITLE (type or print)	B. SIGNATURE	C. DATE SIGNED
JAIME ESCALONA PRESIDENT	Jaime Escalona	7/21/86.

IX. COMMENTS FOR OFFICIAL USE ONLY

Form 3510-1 (6-80) REVERSE

U.S. ENVIRONMENTAL PROTECTION AGENCY

EPA HAZARDOUS WASTE PERMIT APPLICATION

Consolidated Permits Program

(This information is required under Section 3005 of RCRA.)

I.D. NUMBER: F P R D 0 9 1 0 2 7 8 6 — V/A C 1

UFFICIAL USE ONLY

APPLICATION ED	DATE RECEIVED (yr., mo., & day)	COMMENTS

RST OR REVISED APPLICATION

X" in the appropriate box in A or B below *(mark one box only)* to indicate whether this is the first application you are submitting for your facility or a ...plication. If this is your first application and you already know your facility's EPA I.D. Number, or if this is a revised application, enter your facility's .D. Number in Item I above.

RST APPLICATION *(place an "X" below and provide the appropriate date)*

☐ EXISTING FACILITY *(See instructions for definition of "existing" facility. Complete item below.)*

FOR EXISTING FACILITIES, PROVIDE THE DATE (yr., mo., & day) OPERATION BEGAN OR THE DATE CONSTRUCTION COMMENCED *(use the boxes to the left)*

YR.	MO.	DAY
8 6	1 2	0 1

☐ 2. NEW FACILITY *(Complete item below.)*

FOR NEW FACILITIES, PROVIDE THE DATE *(yr., mo., & day)* OPERATION BEGAN OR IS EXPECTED TO BEGIN

YR.	MO.	DAY

SED APPLICATION *(place an "X" below and complete Item I above)*

☐ 1. FACILITY HAS INTERIM STATUS

☐ 2. FACILITY HAS A RCRA PERMIT

CESSES — CODES AND DESIGN CAPACITIES

ESS CODE — Enter the code from the list of process codes below that best describes each process to be used at the facility. Ten lines are provided for ...tering codes. If more lines are needed, enter the code(s) in the space provided. If a process will be used that is not included in the list of codes below, then ...scribe the process *(including its design capacity)* in the space provided on the form *(Item III-C)*.

ESS DESIGN CAPACITY — For each code entered in column A, enter the capacity of the process.

MOUNT — Enter the amount.

UNIT OF MEASURE — For each amount entered in column B(1), enter the code from the list of unit measure codes below that describes the unit of ...easure used. Only the units of measure that are listed below should be used.

PROCESS	PROCESS CODE	APPROPRIATE UNITS OF MEASURE FOR PROCESS DESIGN CAPACITY
...INER (barrel, drum, etc.)	S01	GALLONS OR LITERS
	S02	GALLONS OR LITERS
...E PILE	S03	CUBIC YARDS OR CUBIC METERS
...RFACE IMPOUNDMENT	S04	GALLONS OR LITERS
...:		
...ION WELL	D79	GALLONS OR LITERS
...FILL	D80	ACRE-FEET *(the volume that would cover one acre to a depth of one foot)* OR HECTARE-METER
...APPLICATION ...DISPOSAL	D81	ACRES OR HECTARES
	D82	GALLONS PER DAY OR LITERS PER DAY
...FACE IMPOUNDMENT	D83	GALLONS OR LITERS

PROCESS	PROCESS CODE	APPROPRIATE UNITS OF MEASURE FOR PROCESS DESIGN CAPACITY
Treatment:		
TANK	T01	GALLONS PER DAY OR LITERS PER DAY
SURFACE IMPOUNDMENT	T02	GALLONS PER DAY OR LITERS PER DAY
INCINERATOR	T03	TONS PER HOUR OR METRIC TONS PER HOUR OR GALLONS PER HOUR OR LITERS PER HOUR
OTHER *(Use for physical, chemical, thermal or biological treatment processes not occurring in tanks, surface impoundments or incinerators. Describe the processes in the space provided: Item III-C.)*	T04	GALLONS PER DAY OR LITERS PER DAY

UNIT OF MEASURE	UNIT OF MEASURE CODE
...LLONS	G
...TERS	L
... YARDS	Y
... METERS	C
...NS PER DAY	U
LITERS PER DAY	V
TONS PER HOUR	D
METRIC TONS PER HOUR	W
GALLONS PER HOUR	E
LITERS PER HOUR	H
ACRE-FEET	A
HECTARE-METER	F
ACRES	B
HECTARES	Q

...MPLE FOR COMPLETING ITEM III *(shown in line numbers X-1 and X-2 below)*: A facility has two storage tanks, one tank can hold 200 gallons and the ...r can hold 400 gallons. The facility also has an incinerator that can burn up to 20 gallons per hour.

DUP — V/A C 1

LINE NUMBER	A. PROCESS CODE (from list above)	B. PROCESS DESIGN CAPACITY 1. AMOUNT (specify)	B. PROCESS DESIGN CAPACITY 2. UNIT OF MEASURE (enter code)	FOR OFFICIAL USE ONLY
X-1	T03	600	G	
X-2	T03	20	E	
1		45,000	G	
2		60,000	G	
3				
4				
5	T03	360	E	
6				
7				
8				
9				
10				

EPA I.D. NUMBER (enter from page 1)

D	0	0	9	1	0	2	4	7	8	6	T/A	C
												1

FOR OFFICIAL USE ONLY

W	DUP	T/A	C	DUP
			2	

DESCRIPTION OF HAZARDOUS WASTES (continued)

A. EPA HAZARD. WASTE NO. (enter code)	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE (enter code)	D. PROCESSES 1. PROCESS CODES (enter)				D. PROCESSES 2. PROCESS DESCRIPTION (if a code is not entered in D(1))
0 0 2	* 13000	P	S 0 1	T 0 3			
F 0 0 3	* 2697	T	S 0 2	T 0 3			
0 0 5	* 870	T	S 0 2	T 0 3			
0 0 1	* 280	T	S 0 2	T 0 3			
D 0 0 4	3000	P	S 0 2	T 0 3			
0 0 7	3000	P	S 0 2	T 0 3			
0 0 8	3000	P	S 0 2	T 0 3			
D 0 0 9	3000	P	S 0 2	T 0 3			
0 1 0	3000	P	S 0 2	T 0 3			
0 1 1	3000	P	S 0 2	T 0 3			
0 0 2	40,000	P	S 0 2	T 0 4			NEUTRALIZATION
* * *	5,000	P	S 0 1	S 0 2	T 0 3		*Can also contain corresponding
U * * *	5,000	P	S 0 1	S 0 2	T 0 3		261.33(e) and (f) wastes
							See Attachment I

CONTINUE ON REVERSE

USE THIS SPACE TO LIST ADDITIONAL PROCESS CODES FROM ITEM D(1) ON PAGE 3.

AIR PERMIT NO. PFE-50-1084-0733-I-II-III-(

EPA I.D. NO. (enter from page 1)

											T/A	C
R	D	0	9	1	0	2	4	8	6			6

FACILITY DRAWING

All existing facilities must include in the space provided on page 5 a scale drawing of the facility *(see instructions for more detail)*.

PHOTOGRAPHS

All existing facilities must include photographs *(aerial or ground-level)* that clearly delineate all existing structures; existing storage, treatment and disposal areas; and sites of future storage, treatment or disposal areas *(see instructions for more detail)*.

FACILITY GEOGRAPHIC LOCATION

LATITUDE (degrees, minutes, & seconds)			LONGITUDE (degrees, minutes, & seconds)		
18	15	55	86	09	13

FACILITY OWNER

If the facility owner is also the facility operator as listed in Section VIII on Form 1, "General Information", place an "X" in the box to the left and skip to Section IX below.

If the facility owner is not the facility operator as listed in Section VIII on Form 1, complete the following items:

1. NAME OF FACILITY'S LEGAL OWNER	2. PHONE NO. (area code & no.)
[LILLY AND COMPANY	317-261-2000

3. STREET OR P.O. BOX		4. CITY OR TOWN	5. ST.	6. ZIP CODE
EAST MCCARTY STREET	G	INDIANAPOLIS	IN	46285

OWNER CERTIFICATION

...rtify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached ...nts, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the ...ed information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, ...luding the possibility of fine and imprisonment.

A. NAME (print or type)	B. SIGNATURE	C. DATE SIGNED
...E ESCALONA ...RESIDENT	Jaime Escalona	7/21/86.

OPERATOR CERTIFICATION

...y under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached ...cuments, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the ...ed information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, ...g the possibility of fine and imprisonment.

A. NAME (print or type)	B. SIGNATURE	C. DATE SIGNED
...AME ESCALONA ...IDENT	Jaime Escalona	7/21/86.

ATTACHMENT I

HAZARDOUS WASTE NO.	CHEMICAL SUBSTANCE
U002	Acetone
U003	Acetonitrile
U117	Ethyl Ether
U122	Formaldehyde
U112	Ethyl Acetate
U196	Pyridine
U188	Phenol
U220	Toluene
U154	Methyl Alcohol
U140	Isobutyl Alcohol

SECTION B

FACILITY DESCRIPTION

This section provides a general description of the Eli Lilly Industries, Inc., Mayaguez Plant as required by 40 CFR 122.25(a)(1). This description is intended to acquaint the permit application reviewer with facility operations. Complete details can be found in other parts of this application.

B-1: General Description (122.25(a) (1))

Eli Lilly Industries, Inc., Mayaguez Plant manufactures pharmaceutical compounds. Five (5) final products are manufactured in bulk which are packaged at Carolina's plant. Darvon (Propoxyphene Hidrochloride) and Propoxyphene Napsylate are two analgesic products that are produced since the beginning of the synthesis. Its intermediates are Isobutiro Phenone (IBP), Dextro Carbinol Camphor Sulfonate (DCCS), Dextro Carbinol Base (DCB) and the final products propoxyphene napsylate and hydrochloride. Also, the last step in the manufacture of two antibiotics, Keflex (Cephalexin Monohydrate) and Ilosone (Erytromycin Estolate Blended) are produced at Mayaguez. Other product manufactured in the plant is Dimelor (Acetohexamide) an

hypoglicemic compound that has four steps in its synthesis. The steps are SPAC (Sodium paracetylbenzene), Sulfonamide (Sodium paracetylbenzene sulfonamide), Urethane (Sodium paracetylbenzene urethane) and the final product Acetohexamide. The products manufactured at Mayaguez may change over time, but the processes' general chemistry and Raw Material are similar in their characteristics of flammability and toxicity.

Processes that involve on-site generation of hazardous wastes are both batch and continuous type operations. The batch operations, although repetitious and continuous in nature, vary in frequency or are campaigned depending on product needs. Wastes from these operations are classified as hazardous because they contain constituents listed in 40 CFR Part 261 Subpart D or meet characteristics in 40 CFR Part 261 Subpart C.

Operations producing hazardous wastes include chemical reactions which are performed in one or more selected solvents. They consist in the most part of chemical reactions which take place in a solvent media after which the desired products are separated by operations such as crystallization, filtration, solid washing with solvents, centrifugation and drying. Some of the solvents which contain reaction by-products are submitted to evaporation or fractionation to recover the solvents for reuse. Unrecovered

condensate, and certain bottoms and fractionation cuts are collected and stored as mixed hazardous wastes by definition. Other ongoing wastes are released from the air pollution control equipment or carbon adsorption units into drying vacuum pumps and are treated as such. In addition to maintaining production batch identification and segregation, equipment washing between lots is essential. The resultant washwater and water separated during solvent recovery is collected and stored prior to treatment and disposal.

These operations generate two types of wastes which are incinerated at the Mayaguez Plant. The two types are referred to hereafter as primary and secondary waste. The heat value of the waste determines its classification as either type.

This facility also serves as a storer and treater for waste which is generated from processes similar to those described above at other Eli Lilly Industries, Inc. plants in Puerto Rico.

To treat hazardous wastes this plant possesses a liquid waste incinerator (thermal oxidizer) which consists of a combustion chamber large enough to provide effective destruction of hazardous waste, a quench chamber to cool down the gas stream, and a packed scrubber to remove any acid gas and/or particular matter contained in the flue gas.

B-2: Topographic Maps (122.25(a)(19): 270.14 (c)(3))

To provide thr requested infornmation under this section, and due to the complexity of the Mayaguez Plant, the information will be presented in eight (8) figures. The first map, Figure B-1, is a geodetic map of the plant site area. The scale used here is 1" = 750 feet. The following information is shown:

* the legal boundaries of the plant
* the terrain extending one quarter mile beyond the plant boundaries (1000 feet)
* the surrounding land which is totally used for sugar cane (agricultural)
* the location of water withdrawal wells. Injection wells are not used at the Mayaguez Plant.

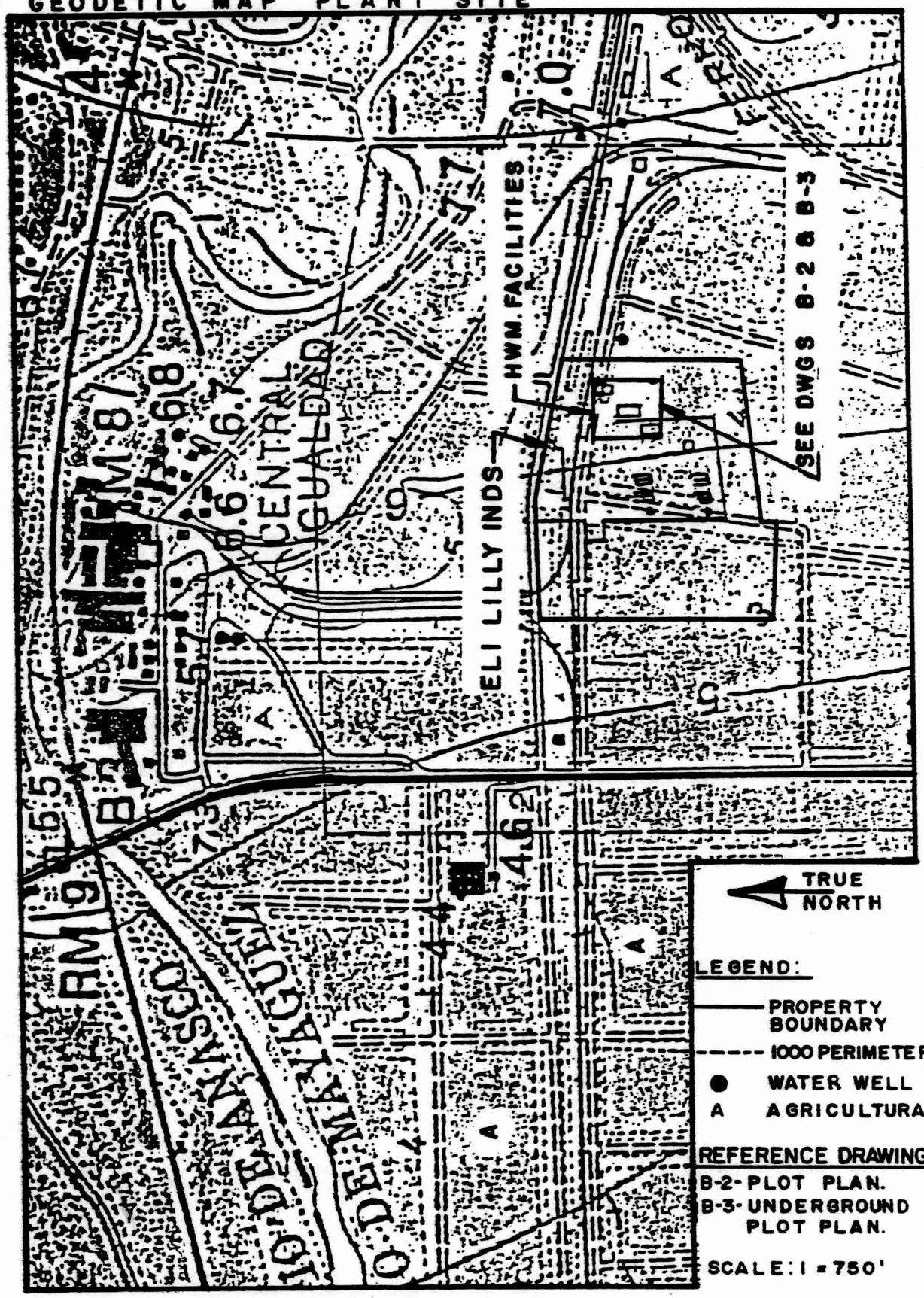
Figures B-2 and B-3 are plot plans which show the following information:

Figure B-2:

* Building locations and their identification.
* Scale 1" = 40 feet - magnetic north location
* Hazardous waste storage tanks
* Waste treatment plant
* Truck loading and unloading stations
* Plant fence and gates for access control

GEODETIC MAP PLANT SITE

FIGURE - B-1



* Access and internal road dimensions
* Route of tank truck and forklift truck

Figure B-3 (underground plot plan, sewer and fire protection)

* Scale 1" = 40 feet
* Process sewer system
* Sanitary sewer system; storm sewer system
* Sprinkler network system
* Hazardous waste incinerator area; outflow to Rio Grande de Anasco
* Barriers for drainage are shown as dikes around tanks and storm drainage ditch dam with sludge gate.

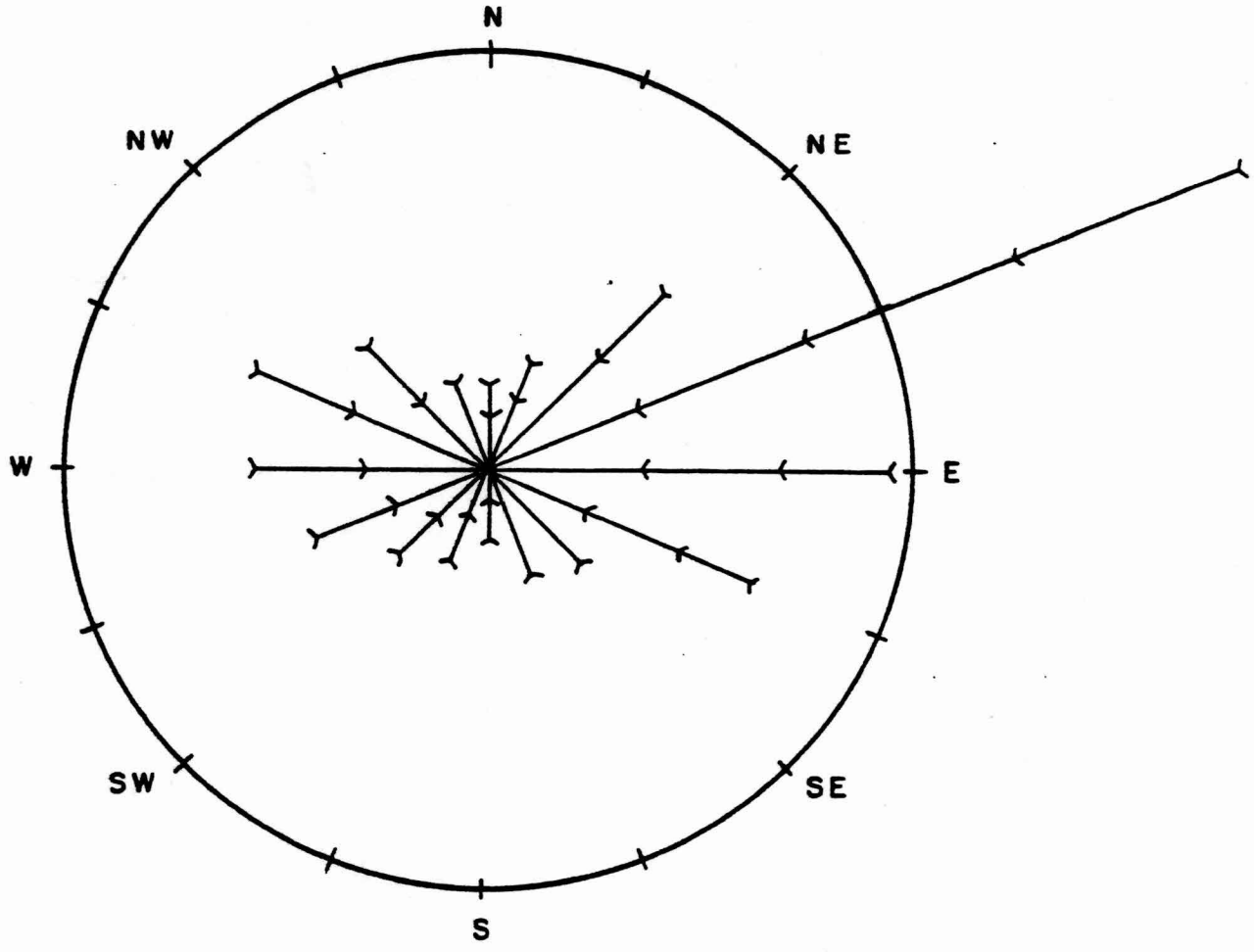
Figure B-4 is a topographic map furnished with one foot contour intervals. This map was prepared using a topographic map of a smaller scale.

Figure B-5 is a wind rose which represents the wind direction frequency and a velocity table for the region. This information was determined from the National Weather Service, Mayaguez.

Figure B-6 is a 100 year flood plain map. This map contains the water level contours measured in meters. According to the map the water elevation reached in a 100 year basis was

FIGURE - B - 5

WIND ROSE



VELOCITY DISTRIBUTION (KNOTS)

	%
CALM	7·6
1 - 3	12·7
4 - 7	54·5
8 - 12	22·3
13 - 18	2·5
19 - 24	1·0

GABRIEL GARCIA CORREA
INGENIERO GRADUADO
LIC. NO. 7639

5 meters above sea level. Two flood zones are identified in this map. Zone 1, that is located close to the river is classified as a major flood area and is depicted on the map as having diagonal shaded lines. Zone 2 is called a minor flood zone or 100 year flood boundary. This zone is depicted as the dotted area on the map.

B-3: Location Information (122.25(a)(ii))

B-3a: Seismic Considerations (122.25(a)(ii))

Seismic considerations are applicable for new facilities. This is an existing facility and therefore this section is not applicable.

B-3b: Flood Plain Standards (122.25(a)(11)(iii)); 264.18(b)

According to data obtained from the U.S. Geological Survey Map obtained from the Puerto Rico Department of Natural Resources, the Mayaguez Plant is located in a 100 year flood plain. However, the water level as shown in Figure B-6 did not reach levels which could cause a washout of the hazardous waste, stored in the container area or in the tanks. The water levels never cleared the upper barrier section of the hazardous waste container area.

B-3b (1) (a): Flood Proofing and Flood Protection Measures (122.25(a)(11)(iv)(A) and (B))

The Hazardous waste management areas are well protected against 100 year floods or even worse. Figure B-7 shows the structural design of the storage container area and the water level that it could reach, (the construction dates from 1980). Figure B-8 shows the engineering calculations which show that storage areas are suitable to store hazardous wastes even under a flood with its wave effects.

B-4: Traffic Information (122.25(a)(10))

Most of the hazardous waste handled and treated in this facility is transferred by means of pumps and piping. However, there are a few instances were hazardous wastes are transported by forklift trucks in 55 gallon containers to the hazardous waste storage area.

The traffic pattern at this facility is a basic north-south and east-west road grid system. There are no subways or bridges where hazardous wastes could pass. Figure B-2 shows the road dimensions, and whether one or two-way traffic volume could be accommodated.

The estimated traffic volume in this facility is less than ten (10) vehicles per day. The vehicles consist of van

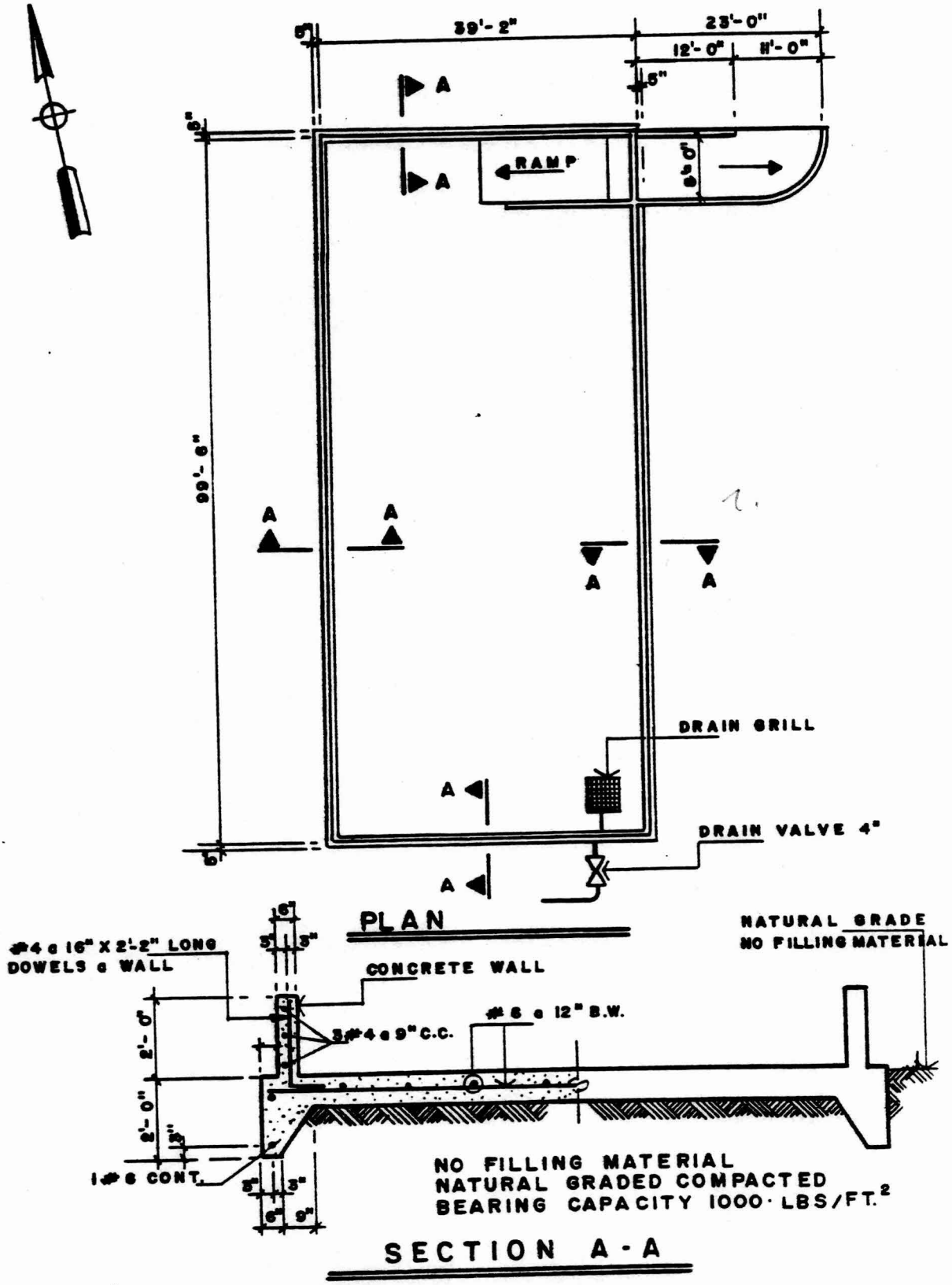
trucks and 5,000 to 7,000 gallons tankers. Although there are no signs to regulate the speed limit in the plant, the velocity is limited to 10 miles per hour and there are stop signs at some entrances of the manufacturing buildings. Furthermore, traffic controls are not necesary due to the low traffic volume. Van trucks unload at building PM-7 unloading station while tankers travel to the unloading station area at PM-8 Tank Farm area. Solvents in bulk as well as hazardous wastes in drums and palletizers are received at the unloading stations at PM-8.

B-4: Traffic Information

The van truck as well the tankers, come from State Road No. 2 and enter a narrow pavimented road at kilometer 146.7. The distance from the state road to the main entrance is about 200 meters. The land at both sides of the road is used for agricultural purposes (sugar cane). Figure B-2 shows the route of the trucks, once they pass from the main gate.

FIGURE B-7

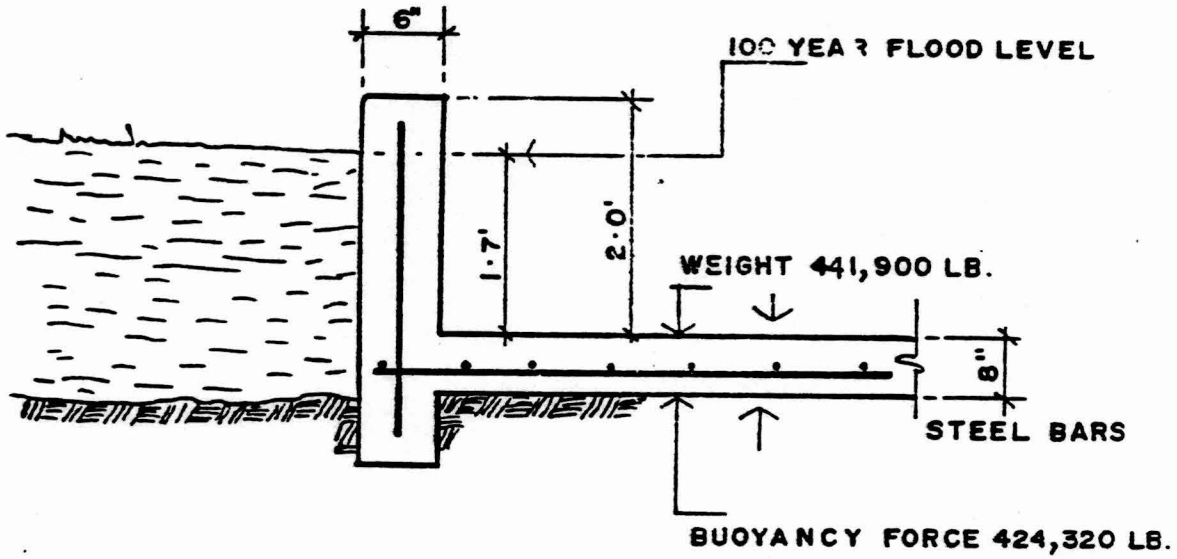
STRUCTURAL DESIGN CONTAINER STORAGE AREA



ENGINEERING CALCULATIONS

The following calculations are provided to demonstrate that the existing Hazardous Waste Drum Storage Area can safely withstand the effects of a flood or storm condition.

I. BUOYANCY FORCE PROOF



A. NOTATION:

V = Volume (cu. ft.)
ρ = Density (lbs/cu. ft.)
W = Weight (lbs)
F = Force (lbs)
H = Height (ft)
D = Depth (ft)
L = Lenght (ft)
T = Thickness (ft)
P = Perimeter (ft)
l = Flood level (ft)
w = Water
c = Concrete
f = Floor of pit
s = Wall of pit

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INGENIERO GRADUADO
LIC. NO. 7639

B. CALCULATIONS

The total buoyancy force in the storage area pit is calculated as follows:

Volume of Water

$V_w = (D)(L)(1)$

$V_w = (40\ ft)(100\ ft)(1.70\ ft)$

$V_w = 6{,}800$ cu. ft.

Weight of Water

$W_w = (V_w)(\rho_w)$

$W_w = (6{,}800\ cu.\ ft.)(62.4\ lbs/cu.\ ft.)$

$W_w = 424{,}320$ lbs ↓

Buoyancy Force

$F_w = W_w$

$F_w = 424{,}320$ lbs ↑

The total weight of the concrete pit is calculated as follows:

Volume of Concrete

$V_f = (D)(L)(T_f)$

$V_f = (40\ ft)(100\ ft)(8\ in)(1\ ft/12\ in)$

$V_f = 2{,}666$ cu. ft.

$V_s = (H)(P)(T_s) = (H)(2)(D + L)(T_s)$

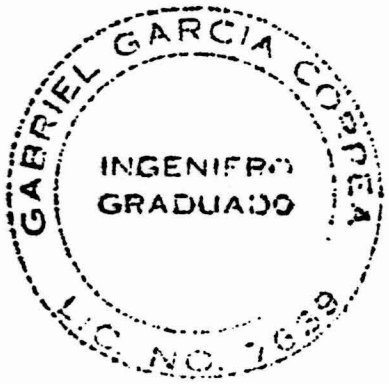
$V_s = (2\ ft)(2)(40\ ft + 100\ ft)(6\ in)(1\ ft/12\ in)$

$V_s = 280$ cu. ft.

$V_c = V_f + V_s$

$V_c = (2{,}666 + 280)$ cu. ft.

$V_c = 2{,}946$ cu. ft.



B. CALCULATIONS (continuation)

Weight of Concrete

$W_c = (V_c)(\rho_c)$

$W_c = (2{,}946 \text{ cu. ft.})(150 \text{ lb/cu. ft.})$

$W_c = 441{,}900 \text{ lbs} \downarrow$

The weight of the pit is greater than the buoyancy forces, so the pit will support the buoyancy effect.

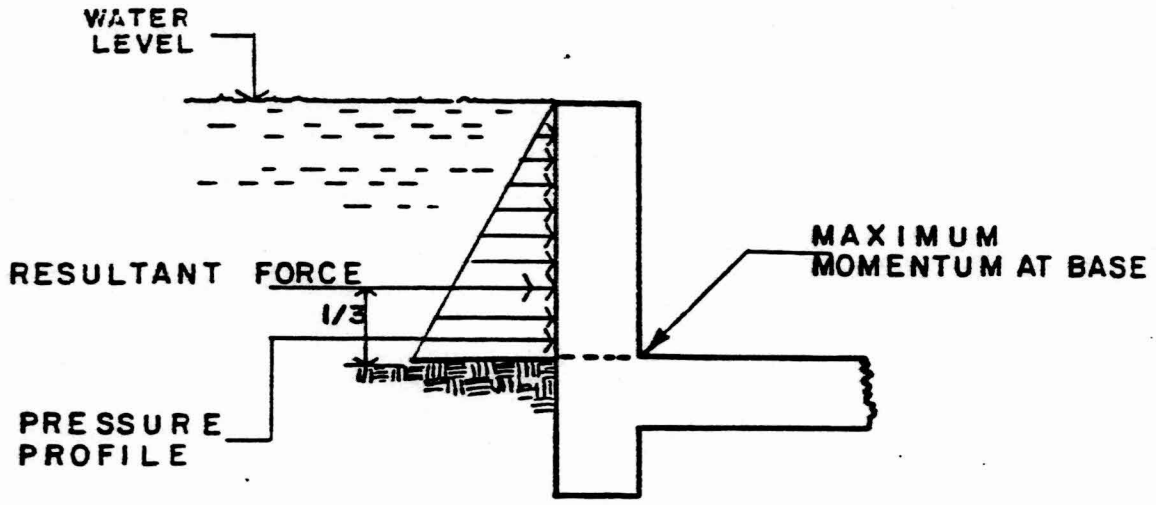
$W_c > F_w$

441,900 lbs > 424,320 lbs

ENGINEERING CALCULATIONS

II. WALL FORCES AND MOMENTUM CALCULATIONS

The maximum momentum exerted by the water is reached when the water just clears the upper limits of the wall.



The calculations for the maximum momentum are as follows:

A. NOTATION:

P = Pressure (lb/sq. ft.)
ρ = Density (lb/cu. ft.)
H = Height (ft)
F = Force (lb)
d = Distance to center of mass of triangle (ft)
M = Maximum Momentum at base (lb - ft)

B. CALCULATIONS

$P = (\rho)(H)$
$P = (62.4 \text{ lb/cu. ft.})(2 \text{ ft})$
$P = 124.8 \text{ lb/sq. ft.}$
$M = (P)(d)$
$M = (124.8 \text{ lb/sq. ft.})(1/3)(2 \text{ ft})$
$M = 83.2 \text{ lbs - ft.}$

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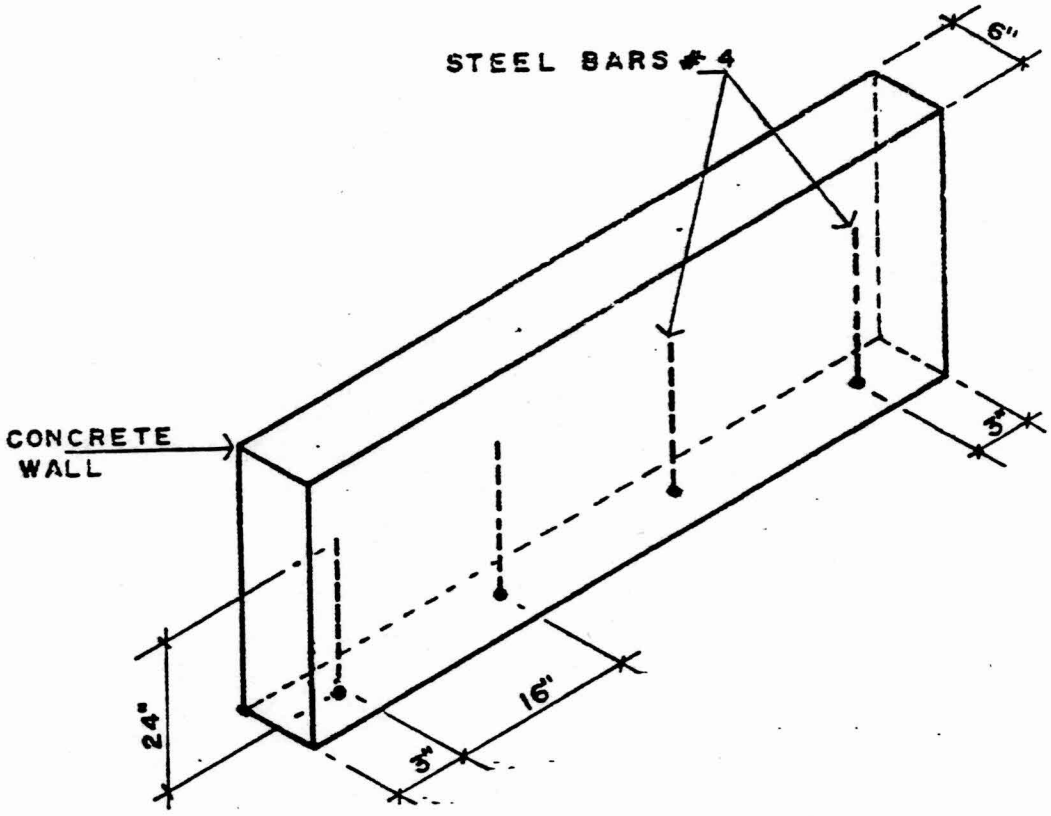
The calculations for the wall design conditions are as follows:

The design criteria used follows USD codes.



A. NOTATION

c = concrete
s = steel
σ = Stress (psi)
Q = Safety Factor for Balanced Force
S.F. = Safety Factor of the design
T = Tensile Force (lbs)
C = Compresive Force (lbs)
A = Cross sectional area (sq. in.)
b = Width of wall (in)
a = Effective distance from normal axis (in)
Jd = Distance from the tensile force to the equivalent compresive force (in)
D = Distance from border of wall to first bar (in)
d = Diameter (in)

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A. NOTATION (continuation)

M = Maximum Momentum (lbs - ft)
M1 = Theoretical Momentum (lbs - ft)
M2 = Design Momentum (lbs - ft)
N = Number of bars per lineal foot

B. CALCULATIONS

Tensile Force

$As = (\pi)(d)^2 /(4)$
$As = (3.1416)\ (0.5\ in)^2 /4$
$As = 0.196$ sq. in

$T = (As)\ (\sigma s)\ (N)$

$T = (0.196\ sq.in)(40{,}000\ psi)(1\ bar\text{-}ft/16\ in)(12\ in/\ 1\ ft)$
$T = 5880$ lbs ↑

Compresive Force

$C = T$ Design of Balanced Forces in a Rectangular Beam

$C = 5880$ lbs ↓
$C = (Q)(\sigma c)(b)(a)$
$5880\ lbs = (0.85)\ (2500\ psi)\ (6\ in)\ (a)$

Note: Q = 0.85 is more stringent than the value specified by the USD code of 0.9.

a = 0.461 in

The code requires for a safe design that
$a > 0.436(d)$
$(0.461\ in) \overset{?}{>} (0.436)(0.5\ in)$
$0.461\ in > 0.218\ in$

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B. CALCULATIONS (continuation)

Theoretical Momentum

Jd = D - a/2

Jd = (3 in) - (0.436 in /2)

Jd = 2.782 in

M1 = (T) (Jd)

M1 = (5880 lbs) (2.782 in) (1 ft/12 in)

M1 = 1363 lbs - ft

Design Momentum

M2 = (Q)(M1)

M2 = (0.85) (1363 lbs - ft)

M2 = 1158.55 lbs - ft

Safety Factor of the Designed Wall against a Water Flood

S.F. = (M2) / (M)

S.F. = (1158.55 lbs - ft) / 83.2 lbs - ft)

S.F. = 13.9

Note: Taking into account the wave effect using a Lilly criteria the actual safety factor is

Actual S.F. = SF / 1.5

Actual S.F. = (13.9) / (1.5)

Actual S.F. = 9.2

SECTION C

WASTE CHARACTERISTICS

This section describes the chemical and physical nature of the hazardous wastes stored and treated at the Eli Lilly Industries Mayaguez facility and the waste analysis program for sampling, testing and evaluating the wastes to assure that sufficient information is submitted in accordance with 40 CFR Part 270.14(b)(2) and (3).

C-1: Chemical and Physical Analysis (40 CFR 270.14(b)(2);264.13(a))

Liquid and solid hazardous wastes are generated as waste by-products from the manufacture of Eli Lilly Industries Inc. products. These products are manufactured mainly by batch operations using selected solvents. Due to the presence of these solvents, the resulting waste by-products contain constituents listed in 40 CFR 261 Subpart D or meet characteristics defined in 40 CFR 261 Subpart C.

Operations producing hazardous wastes include chemical reactions which are performed in one or more selected solvents. The reaction products are precipitated or crystallized, followed by solids separations, solids washing with selected solvents and drying. The

solvents, after use, are recovered by distillation and/or fractionation for reuse. Unrecovered fractions and still bottoms are collected and stored as mixed hazardous wastes. In addition, to maintain production batch identification and segregation, equipment washing between lots is essential. The resultant washwater containing solvents, process water, and waste separated during solvent recovery is accumulated and stored.

Products manufactured at Mayaguez (PRIV) use written protocols. These protocols (manufacturing tickets) are unique to each product but they use the same family of solvents. The batch operations used to produce these products are generally not run year-round, but are "campaigned" depending upon product needs. As a result, wastes are generated with similar compositions but varying concentrations. Several waste streams may result from these manufacturing activities. Solvent laden waste solids result from the solids separation phase of the processes. Unrecoverable solvents and still bottoms from recovery operations are liquid wastes resulting from these manufacturing activities. Other liquid wastes include equipment wash waters which contain solvents, process waters, and water separations from the solvent recovery operations.

Offsite hazardous wastes from Eli Lilly Industries, Inc. manufacturing facilities in Carolina are stored and treated at Mayaguez. These wastes contain solvent laden solids and liquid solvents from pharmaceutical manufacturing processes. These

solvents are in the same family of solvents as those stored and treated at Mayaguez.

C-1(a) Containers

Small volumes of hazardous wastes are stored at Mayaguez in containers prior to onsite treatment or offsite disposal. These types of wastes can be categorized into groups consisting of: solvent laden solids for off-site disposal, waste solvents for on-site treatment or off-spec 40 CFR 261.33 (e) or (f) wastes.

Solvent laden solid wastes or solid wastes containing EP toxic heavy metals are destined for disposal off-site at approved secure chemical management facilities. These wastes are collected in containers and identified with the EPA hazardous waste numbers D001,D004,D005,D006,D007,D008,D009,D010,D011,F001,F002,F003 and F005. Table C-1 includes the actual or potential hazardous constituents in containerized solid wastes stored at Mayaguez. The relative concentrations are similar to those for the liquid hazardous waste shown in Table C-3. The constituents and relative concentrations are known from the manufacturing process tickets (protocols).

Liquid waste solvents from Eli Lilly Industries, Inc. at Carolina, manufacturing processes are destined for incineration on-site on tank farm at Mayaguez. These wastes are stored in drums or palletainers (portable tanks 250 gals.) in stainless steel until

the contents can be transferred to waste solvent storage tanks. The containers are identified with the EPA hazardous waste numbers D001, D004, D005, D006, D007, D008, D009, D010, D011, F001, F002, F003 and F005. Table C-1 includes the actual or potential hazardous constituents in containerized liquid solvent wastes stored at Mayaguez.

The remaining materials stored in containers at the hazardous waste container storage area are off-specification commercial chemicals. These materials have been analyzed by the manufacturing departments, who have determined that the material is not satisfactory for production use. The material is stored in the DOT approved container in which it was received and properly labeled with the appropriate EPA numbers. Unknown or non-labelled drums are not accepted for storage until they have been properly characterized. We could expect to receive occasionally 55 gallons drums of off-specification corrosive hazardous material. Once received, this containers will be inmediately transferred to the facilities elementary neutralization system. This waste is solely hazardous waste because they exhibit the characteristic of corrosivity.

Written information on labels should be written in permanent ink & the labels should be positioned so that it is visible for inspection.

C-1(b): Tanks

Liquid hazardous wastes (solvents) are stored in tanks prior to treatment by incineration. Two types of liquid hazardous wastes are stored and incinerated at Mayaguez: primary waste and

secondary waste. Primary waste is spent solvents and is capable of supporting autonomous combustion in the incinerator's primary combustion chamber. Secondary waste is predominately water with small amounts of solvent which is injected into the incinerator's main oxidation chamber for thermal destruction adjacent from the primary wastes. These two types of wastes are treated in the incinerator. Table C-2 includes the actual or potential hazardous constituents in the liquid waste in tanks stored at Mayaguez.

The specific gravities of the primary and secondary wastes are important parameters for tank storage. The specific gravity of primary waste does not exceed 1.20 and the specific gravity of the secondary waste does not exceed 1.10. These values are within the design tolerances of the storage tanks. Additional waste characterization information is presented in Sec. C-1(e).

C-1(c): Waste Piles

Eli Lilly Industries, Inc., Mayaguez does not have hazardous waste piles.

C-1(d): Surface Impoundments

Eli Lilly Industries, Inc., Mayaguez does not have hazardous waste surface impoundments.

TABLE C-1
ELI LILLY INDUSTRIES, INC.
CONTAINER STORAGE AREA HAZARDOUS WASTE CONSTITUENTS

Hazardous Constituents	EPA Hazardous Waste Number	Basis for Hazardous Waste Designation
Spent halogenated solvents used in degreasing (tetrachlorethylene, trichlorethylene, methylene chloride, 1,1,1-trichlorethane, carbon tetrachloride, and chlorinated flurorcarbons) and sludges from the recovery of these solvents in degreasing operations.	F001	Waste contains listed toxic solvents.
Spent halogenated solvents and still bottoms from the recovery of these solvents (tetrachloroehtylene, methylene chloride, trichloroethylene, 1,1,1-trichloroethane, chlorobenzene, 112, trichloro-1,2,2 trifluoro ethane orthodichloro-benzene, trichlorofluoromethane).	F002	Waste contains listed toxic solvents.
Spent non-hallogenated solvents and still bottoms from the recovery of solvents (xylene, acetone, ethyl acetate, ethyl benzene, ethyl ether, methyl isobutyl ketone, n-butyl alcohol, cyclohezanone, methanol)	F003	Waste contains listed these ignitable solvents.
Spent non-halogenated solvents and still bottoms from the recovery of these solvents (toluene, methyl ethyl ketone, carbon disulfide, isobutanol, pyridine).	F005	Waste contains listed and ignitable solvents.
Ignitable waste	D001	Flash point for waste is less than 60C (140F)
EP Toxic	D004 @ D0011	Wastes are EP toxic-261.24
Off-specification Commercial chemicals	P023 @ P122 U00 @ U247	Listed in 261.33(e)&(f)
Corrosive waste	D002	See Section A Corrosive

C-1(e): Incinerators

As noted in Section C-1(b), Mayaguez incinerates two types of liquid wastes: primary waste and secondary waste. Primary and secondary wastes are classified as hazardous because they contain constituents listed in 40 CFR 261 Subpart D and/or they exhibit the characterisitics defined in 40 CFR 261 Subpart C. Table C-3 is a general listing of the constituents in liquid wastes incinerated at Mayaguez. Liquid wastes may also contain compounds listed in Appendix VIII of 40 CFR Section 261. In order to determine the chemical composition and physical characteristics of the liquid wastes, primary and secondary wastes have been sampled and analyzed. The results of these analyses are presented in Table C-3.

As can be seen in Table C-3, primary and secondary wastes contain both hazardous and nonhazardous constituents. The concentration range of the waste compositions is due to the scheduling or campaigning of the batch operations which generate these wastes. Table C-3 lists the constituents in the wastes which are normally present in concentrations greater than 0.01% (100 ppm). Appendix VIII constituents are underlined.

Organic constituents which are listed in 40 CFR Part 261, Appendix VIII, and which may be present in primary or secondary wastes during the permit period are listed below:

TABLE C-2
ELI LILLY INDUSTRIES, INC.
TANK STORAGE AND INCINERATION AREAS HAZARDOUS WASTE CONSTITUENTS

Waste Type	Hazardous Constituents	EPA Hazardous Waste Number	Basis for Hazardous Waste Designation
Primary and Secondary	Spent halogenated solvents used in degreasing (tetrachloroethylene, trichloroethylene, methylene chloride, 1,1,1-trichloroehtane, carbon tetrachloride, chlorinated flurocarbons) and sludges from the recovery of these solvents in degreasing operations.	F001	Waste contains listed toxic solvents
Primary and Secondary	Spent halogenated solvents and still bottoms from the recovery of these solvents (tetrachlorethylene, methylene chloride, trichloroethylene, 1,1,1-trichloroethane, chlorobenzene, 1,1,2-trichloro-1,2,2-trifluroethane, orthodichlorobenzene, trichlorofluoromethane)	F002	Waste contains listed toxic solvents
Primary and Secondary	Spent nonhalogenated solvents and still bottoms from the recovery of these solvents(xylene, acetone, ethyl acetate, ethyl benzene, ethyl ether, methyl isobutyl ketone, n-butyl alcohol, cyclohexanone, methanol)	F003	Waste contains listed ignitable solvents
Primary and Secondary	Spent nonhalogenated solvents and still bottoms from the recovery of these solvents(toluene, methyl ethyl ketone, carbon disulfide, isobutanol, pyridine)	F005	Waste contains listed toxic and ignitable solvents
Primary and Secondary	Ignitable waste	D001	Flash point for waste is less than 60C (140F)

Acetonitrile
Acetophenone
Benzene
Carbon Tetrachloride
Chlorobenzene
Chloroform
Dibromoethane
Dichlorobenzene
Ethylene Dichloride
Isobutyl Alcohol
Methylene Chloride
Phenol
Pyridine
Toluene
1,1,1-Trichloroethane
1,1,2-Trichloroethane

C-1(e)(1): Trial Burn

A trial burn at the Mayaguez facility will be based on two conditions to demonstrate compliance with 40 CFR Part 264.343 requirements for destruction of principal organic hazardous constituents (POHC) as well as the control of HCL and particulate emissions. The trial burn will involve incineration of a specially prepared primary and secondary waste feed that complies with both conditions with characteristics approximate to those listed in table C-4.

The ash content in the waste influent is removed as particulate matter by the incinerator scrubber. The water used in the scrubber is discharged to an NPDES permitted facility. Therefore, there is no ash expelled by the incinerator.

The concentration of the constituents in the trial burn mixtures shown in table C-4 represents both the "worst case" (condition #2) and the normal case (condition #1). The second condition will represent a more stringent test of incinerator performance than the mixture of components shown in table C-3. The condition #2, contains the highest anticipated total concentration of combined halogenated solvents that might be present during the permit life.

The most difficult to burn Appendix VIII constituent present in the condition #2 is Carbon Tetrachloride. The three (3) Appendix VIII compounds more difficult to incinerate than Carbon Tetrachloride (Trichloro fluoromethane, Tribromomethane and dichlorodifluoromethane) are not either raw materials or by products of Lilly operations.

The first condition will represent a similar mixture of component as shown in table C-3, however, the POHCs will be Methyl Chloride and Acetonitrile to assure an effective destruction and

TABLE C-3
COMPOSITE LIQUID WASTE
PHYSICAL AND CHEMICAL ANALYSIS
(Units = w/v%)

Parameters	Primary Waste Range	Secondary Waste Range
Acetone	0 - 60	0 - 10
Acetonitrile	0 - 2	0 - 2
Amyl Acetate	0 - 15	0 - 1
Amyl Alcohol	0 - 1	0 - 1
Amylene	0 - 8	0 - 2
Cyclohexylamine	< 1	< 1
Diethyl Ether	< 1	< 1
Ethanol	0 - 5	0 - 3
Ethyl Acetate	0 - 15	0 - 10
Hexane	< 1	< 1
Isoamyl Acetate	0 - 15	0 - 2
Methanol	0 - 30	0 - 25
Methyl Chloride	0 - 5	
Toluene	0 - 35	0 - 2
Water	5 - 10	50 - 95

operation.

C-2: Waste Analysis Plan

Hazardous wastes which are stored or treated at the Mayaguez facility are by-products of the manufacture of Eli Lilly Industries, Inc. products. Prior to treatment or storage of those hazardous wastes, they must be characterized so that the Mayaguez facility can determine proper methods for storage or treatment.

This section describes the waste analysis plan for those hazardous wastes.

C-2(a): Parameters and Rationale

Hazardous liquid wastes which are incinerated at Mayaguez or hazardous solid wastes which are stored prior to shipment for disposal at an approved off-site facility are by-products of Eli Lilly Industries, Inc., manufacturing, research, development and quality control operations. Wastes from these operations are classified as hazardous because they contain organic solvents of the type listed in Table C-2, EP toxic heavy metals, or they are off-spec commercial materials listed in 40 CFR 261.33(e) or (f). The hazardous constituents in the waste are solvents (listed in Table C-3) which are compatible when mixed in any proportion. Analysis of individual mixtures of waste is required only to verify that the composition of the liquid waste for incineration is within

TABLE C-4
APPROXIMATE TRIAL BURN WASTE FEEDS FOR LIQUID INCINERATOR

Condition # 1

Parameter	Primary Waste Solution	Secondary Waste Solution
Heat of Combustion (Btu/lb)	8110	2140
Viscosity (cp)	1.094	1.046
Specific Gravity	0.857	0.951
Total Organic Chlorides (%)	3.5	0
Water (%)	18	85
Ash (%)	2	1
Constituents		
Methylene Chloride (%)	5	-
Methanol (%)	40	-
Acetone (%)	5	4
Ethylene Dichloride (%)	-	-
Toluene (%)	7	-
Carbon Tetrachloride (%)	-	-
Acetonitrile (%)	10	-
Isobutyl Alcohol (%)	-	-
1,1,2-Trichloroethane (%)	-	-
Dibromoethane (%)	-	-
Pyridine (%)	-	-
Benzene (%)	-	-
Chloroform (%)	-	-
Ethyl Acetate (%)	5	5
Amyl Acetate (%)	5	-
Hexane (%)	3	5

TABLE C-4 CONT.
Condition # 2

Parameter	Primary Waste Solution	Secondary Waste Solution
Heat of Combustion (Btu/lb)	5350	1040
Viscosity (cp)	1.064	1.011
Specific Gravity	0.973	0.972
Total Organic Chlorides (%)	20.2	2.1
Water (%)	20	85
Ash (%)	4	1
Constituents		
Methylene Chloride (%)	18	3
Methanol (%)	15	-
Acetone (%)	12	3
Ethylene Dichloride (%)	2	-
Toluene (%)	3	-
Carbon Tetrachloride (%)	4	-
Acetonitrile (%)	10	-
Isobutyl Alcohol (%)	2	-
1,1,2-Trichloroethane (%)	2	-
Dibromoethane (%)	3	-
Pyridine (%)	2	-
Benzene (%)	2	-
Chloroform (%)	1	-
Ethyl Acetate (%)	-	4
Amyl Acetate (%)	-	-
Hexane (%)	-	4

the ranges qualified by the incinerator trial burn testing.

The concentration of the halogenated material in the waste will determine what condition of trial burn will be selected.

If the waste to be burnt, either primary or secondary waste, contains halogenated material in a concentration greater than 2%, the condition #2 will be used, otherwise condition #1 will be selected.

We will know in advance if the waste contains halogenated material, since this waste comes from Carolina and is managed by our operators.

A dedicated storage tank will be used to store halogenated material to prevent cross contamination to other tanks. Whenever this dedicated tank is to be used, analysis must be performed in advance to assure that no halogenated material is present in concentration above 2%.

If the concentration of halogenated material is above 1%, the operation parameters established under condition #2, will be used for that specific material.

In the event that analysis shows that one of the dedicated waste does not contain halogenated material and no halogenated wastes have been added to the tank, no further analysis will be required

for the treatment of the waste of this specific tank, besides to the weekly analysis already established for the rest of the wastes.

C-2(a)(1): Feed Tank Analysis

Primary waste and secondary waste are collected and stored in separate tank systems. The primary waste system consists of two receiving/feed tanks from which waste is pumped to the incinerator for high temperature thermal oxidation. The secondary waste system is made up of three holding/feed tanks. The secondary waste will be either pumped from a full feed tank to the incinerator for treatment, or to holding tanks which collect and hold the secondary waste while the feed tank is on line pumping waste to the incinerator for treatment. For both primary and secondary waste systems, the tanks can be alternated between holding tanks and feed tanks.

The U. S. Environmental Protection Agency Region II requested in a letter dated April 28,1986 a revised waste analysis program for the incinerator waste feed. Eli Lilly Industries, Inc. has modified the analysis in accordance with EPA's request. The revised analysis program involves the following:

1. Once every two weeks primary and secondary wastes samples will be mixed from individual tank samples that have been collected using the procedures described in Section C-2(cc).

2. These samples will have a composition proportional to tank volume forming a primary waste composite sample and a secondary waste composite sample.

3. The samples will then be analyzed for the following parameters using procedures described in Section C-2(b).

Parameter	Rationale for Inclusion in Waste Analisis Plan
Percent Total Organic Chlorides	Verify expected ranges of HCL formation to calibrate scrubber and neutralizing system operations.
Percent Water	Verify primary waste and secondary waste are being segregated properly
pH (Secondary Waste only)	Assure tank structural integrity
Heat of Combustion	Verify lower limit established by trial burn testing.
Specific Gravity	Assure tank structural integrity.
Ash Content	Verify consistency of wastes to allow calibration of scrubber system.
Viscosity	Assure ability to pump wastes.
Appendix VIII Constituents Carbon Tetrachloride Methylene Chloride	Verify expected ranges of permitted POHC's and verify the level of other constituents with a heat of combustion less than that of carbon tetrachloride.

NOTE: All Appendix VIII constituents believed present in concentrations greater than 0.01% by volume measured by gas chromathograph, with a heat of combustion less than carbon tetrachloride.

C-2(b): Test Methods

The test methods used to determine the waste characteristics listed in Section C-2(a) are described in Table I of Appendix V.

C-2(c): Sampling Methods

See Appendix V.

C-2(d): Frequency of Analysis

Waste analyses for the parameters listed in Section C-2(a) are conducted every two weeks. Should the sample day fall on a day when the plant is not operating, a sample will be taken on the next available working day.

C-2(e): Additional Requirements for Waste Generated Off-Site

Eli Lilly Industries, Inc., Mayaguez Plant, receives hazardous wastes from other Eli Lilly Industries, Inc. facilities for treatment or storage. Before these wastes are accepted for treatment or storage, the generating facility must supply the Mayaguez plant's Environmental personnel with a completed Waste Stream Information Sheet. (WSIS)

The WSIS is a procedure to characterize wastes from other Lilly facilities prior to storage or treatment at Mayaguez. The characterization will be performed as described in section C-1(e) using the methods contained in Table 1 Appendix V. At Lilly Industries, Inc., the WSIS must be completed by the generating department before the waste is accepted at the Mayaguez plant for treatment or storage. The WSIS indicates a certification that indicates the three (3) Appendix VIII compounds more difficult to incinerate than carbon tetrachloride not present in the waste. The WSIS is then sent to the Mayaguez facility where it is evaluated to determine acceptability for storage or treatment on site or for disposal off-site at an approved landfill. After the WSIS is approved by Mayaguez, an identification number is assigned to the waste. This number is placed on all drums or palletainers of waste or the manifest for tankers and serves to identify the waste material.

The waste characterization data requested on the WSIS includes the following (where applicable):

-Shipping name
-DOT hazard class
-Process description and name
-Inorganic waste components (including total cyanide and free cyanide)
-Toxicity level (dermal and inhalation)

-Hazard level (flammability, reactivity, corrosivity, health)

-Basic chemical analyses

-Heavy metals

-Organic waste components (0.1%, depending of the detection limit set by the method of analysis)

Environmental personnel will review the data to determine proper disposition of the waste. The review will include such items as the compatibility , reactivity, combustability, and biotreatability of any off-site waste to determine the best treatment alternative. The review may involve analysis of a waste sample and will involve knowledge of the system generating the waste. A characteristic for "fingerprinting" the waste will also be selected. Finger print will
identify the waste, besides the code number established for a specific waste. Examples of finger print are analysis of pH, specific Gravity, Viscosity, COD etc. The analysis methods are as established in Table 1 of Appendix V.

Hazardous wastes received from off-site are accompanied by a Hazardous Waste Manifest. When the waste is received, an operator checks the description of the waste on the manifest with what is actually received. Next, the off-site waste will be sampled and "fingerprinted". The waste will be sampled using techniques discussed in Appendix V. The sample will then be "fingerprinted" using the method determined during the WSIS review.

When the manifest and fingerprinting confirmations have been made, the hazardous waste will be placed in the proper treatment system. The disposition of the waste is recorded on the manifest (such as the number of the tank in which the waste is placed), which will serve as the operating record for off-site wastes.

C-2(f): Additional Requirements for Facilities Handling Ignitable, Reactive, or Incompatible Waste

Waste stored in containers is generated in both Carolina and Mayaguez plant. This waste is well identified by Manifest documents and characterized according with the WSIS. These wastes can be either ignitable or corrosive. The ignitable ones are stored in either steel drums, or stainless steel palletainers, while the corrosive ones are stored in plastic drums. None of the wastes stored in the Hazardous Waste Storage area are reactive either with the container material or with water or other wastes present in the plant.

The Hazardous Waste Storage Area is surrounded by dikes and has a concrete slab to prevent leaks to the ground in case of a spill.

When a spill is detected the following procedure is followed:

1. Identification of the leaking material is done. The source from which the leak originates is found, if possible.
2. Using the proper safety equipment and precautions the

leak is controlled.

3. Using the equipment assigned for spill control the material is collected from the containment floor.
4. The collected material is stored in drums and placed in the Hazardous Storage Area for final disposition.

All primary and secondary waste is neutralized prior to being transferred to the storage tanks. Neutralization processes are carried out in the manufacturing building. The pH of the primary and secondary waste is kept between 4 and 12.

The limits in the trial burn will be way above the limits of the worst waste generated in Carolina and Mayaguez plants. The chlorine concentration tested in the trial burn will be about ten times greater than the amount present in the waste that we burn in our incinerator. These high limits will ensure that the waste treated in the incinerator complies with the trial burn limits.

SECTION D

PROCESS EQUIPMENT

D-1: Containers

D-1a: Containers with Free Liquid

D-1a(1): Description of Containers (122.18(b)(a); 264.172)

The only containers that are used in our plant are 55 gallon steel drums, 57 gallons plastic drums and 250 gallons stainless steel palletainers to be treated in the thermal oxidizer. Upon the arrival of these containers to the Mayaguez Plant, the containers are transported to the storage hazardous waste area. Containers containing liquid hazardous waste are later emptied into waste storage tanks to be incinerated. The only containers which are normally stored for a period of over ninety (90) days are those containers that store sludge or solid hazardous wastes, prior to shipment off site to an approved facility.

Containers that store both liquid wastes or sludge waste are constructed of metal and are inspected weekly and maintained in good working condition.

Most of the containers used to store hazardous waste do not have liners. The containers have a coating that protects the drum against corrosion. The coating is fully compatible with the waste stored. Palletainers are specially designed containers to facilitate the handling during shipping. They are designed to withstand up to 9 psig and are fully compatible with the waste stored. All containers meet the standards of the Department of Transportation (DOT).

What kind of special coating is used to protect the cement base from corrosive waste? How is the coating maintained?

A detailed diagram of the containment system for the Hazardous Waste storage area is shown in Figure B-7. This storage area is capable of holding a spill of 100% of the material stored, since the retention volume is ten times greater than the required. The floor is reinforced concrete 6 inches minimum thickness to prevent percolation. This containment has 1/8 inch grade to a grill for draining purposes. The concrete used at the floor has a compression specification of 3000 psig and the concrete used at the walls has a compression specification of 2500 psig. For the ignitable materiales a roof is provided to protect them against sunlight exposure.

The waste stored in the Hazardous Waste storage area is compatible with the construction material. For protection against corrosive wastes a special coating covers the concrete, that can stand very low pH values.

D-1a(2): Container Management Practices (264.173)

Drum containers used for hazardous wastes are washed and stored in the empty drum area for final disposal. These drums could either be reused to store hazardous waste or crushed and disposed in a municipal landfill as non-hazardous waste. The criteria to determine when the drums will be reused or destroyed will depend on the physical condition of the drums. Decontamination procedures to render the drum not contaminated are explained in Section D-1(b)(4). The palletainers are reusable containers and are shipped back and forth from Carolina's plants to the Mayaguez plant.

The drums which store hazardous waste are handled by qualified operators. In the event that drums are received from other Lilly plants, all containers will be received at the PM-7 (hazardous materials building) unloading area, identified, verified and then routed by forklift trucks to the hazardous waste storage area. All drums in the hazardous container storage area are stored on pallets and are routinely checked to assure that they are properly closed during the storage period. An aisle space of 30 inches is provided between rows of pallets for better access during inspection.

All containers are kept closed except during the addition or removal of the waste on site. During the period of time drums are in the storage area, the drums are carefully closed, and each drum is inspected and checked every week.

D-1a(3): Containment System Operation (122.25(b)(1); 264.175(b))

Drum containers at the Mayaguez facility store hazardous liquid wastes usually for not more than thirty (30) days. The hazardous waste liquid is managed according with Section D-1(a).

All containers are stored in a container storage area constructed of concrete which has the capability to hold any spill, leak or precipitation that might occur in the area.

If any crack or gap is observed during the inspection, the following criteria is followed for repairing:

1. If the crack is not greater than 1/16 inch, sealant coating will be used to cover the crack or gap.
2. If the crack is greater than 1/16 inch a "V" shaped groove will be made 2 inches deep along the crack. Then cement bonding will be placed and the crack covered with cement. The following day the sealant coating will be applied on top of that.

D-1a(3)(a): Requirement for the base or liner to contain liquids (264.175(a)(1))

The base of the container storage area has been constructed of solid concrete which has a minimum thickness of 6" at any point. Inspection of the containment area is made on a weekly basis to assure that the storage area is free of cracks and gaps.

D-1a(3)(b): Containment System Capacity
(270.15(a)(2); 264.175(a)(2)

This containment area has the capacity to hold up to 58,000 gallons which would allow the equivalent liquid volume storage of 580,000 gallons. However the site will store a maximum of 900 drums of 55 gallon each, or not more than 50,000 gallons of drum storage capacity in this area.

In the event of a leak or spill the 1/8" slope of the pit will induce the material to move to the southern east corner. At this corner there is a grill and a small pit of dimensions 12" x 12". The spilled liquid is collected in this small pit and transferred to new drums with a pneumatic pump. The residues of the material are then cleaned using an adsorbent material. All containers are stored on wood pallets, which provide an elevation of 4" from the ground level. The drums are usually stored in one pallet level, only under the unusual circumstances of space limitation two level pallets will be used. refer to diagram?

D-1a(3)(c): Containment System Drainage

The containment area is sloped in a southerly direction to a drain system with valves that route any spills or leaks to the same sewer system as the tank farm. Before any noncontaminated stormwater is drained through this valve an operator will determine that the liquid is free of any contaminant by chemical or physical analysis.

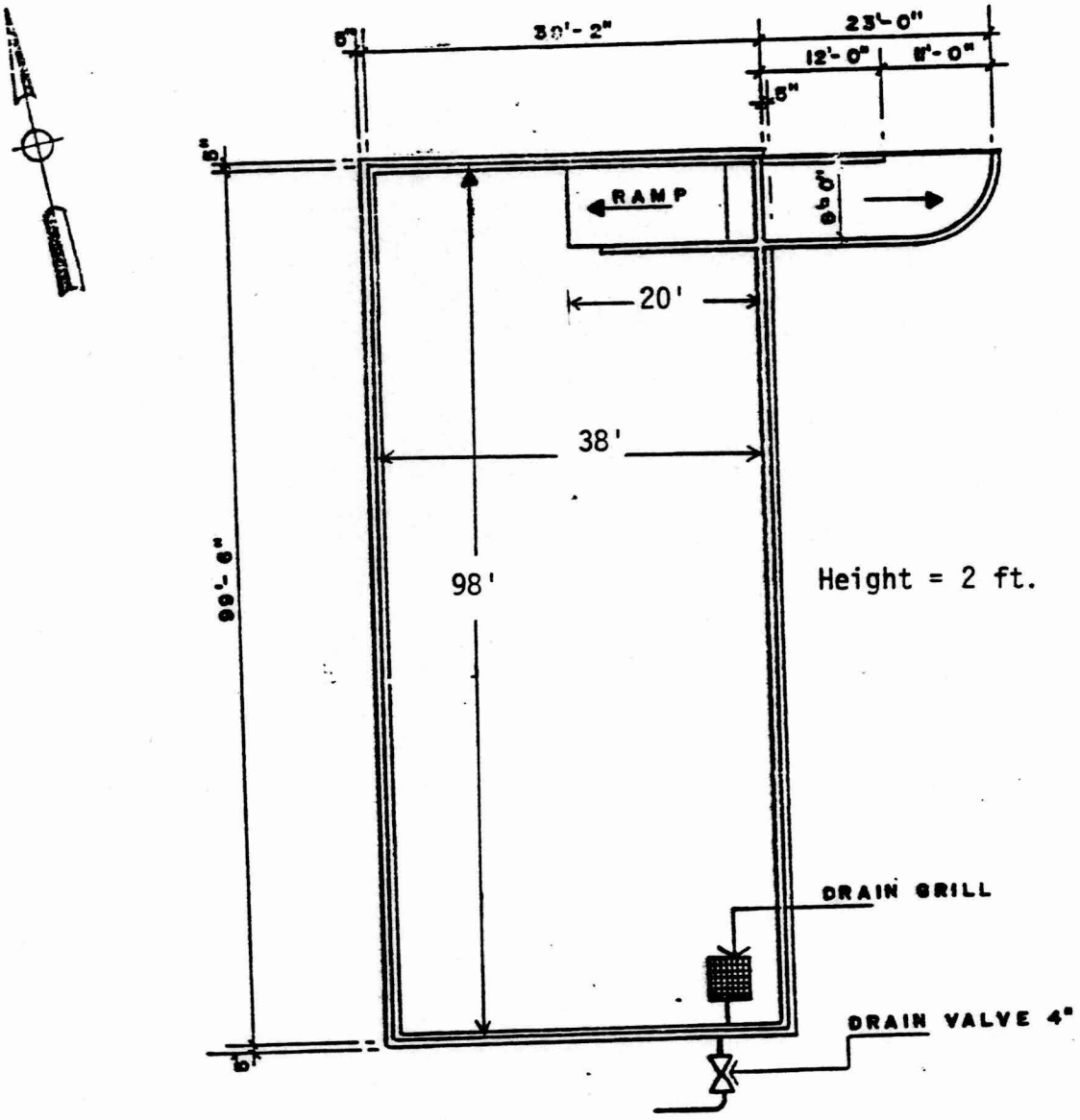
Figure D-1 shows the dimension of the containment system. The enclosed volume of the containment is 7288 cubic feet equivalent to 54,587 gallons. Since we contemplate to store a maximum of 900 drums equivalent to 49,500 gallons, the containment system provides enough room to hold all the waste stored in drums.

D-1a(3)(d): Control of Run-off (270.15(a)(4); 264.178(b)(4))

The containment area has enough space or volume to prevent any run-on that could occur in the area. Run-on water is prevented by the 2 feet concrete wall that surrounds the containment system's. As was stated in Section D-1a(3)(c) the containment has sufficient space to contain any run-on that could occur.

Curbs and dikes are provided in the tank storage area, the container storage area and truck unloading station. These containment systems are made with concrete cement and are designed to hold the total volume stored within its enclosure. The run-on water never passes through these areas. A storm sewer system is designed (Figure B-3) to collect and handle the run-on water. All containment systems have valves for drainage which are conducted to the storm sewer system. A grading of 1/8 inch per lineal feet is provided in the containment system to the drain valve which ensures a complete removal of the water from the contaminant system once it is drained.

CONTAINMENT SYSTEM CAPACITY



A. NOTATION

V = Volume (cu. ft.)
L = Lenght (ft)
W = Width (ft)
H = Height (ft)
r = Ramp
c = Containment
t = Total
Q = Capacity (gal)
F = Conversion Factor (gal/cu. ft.)

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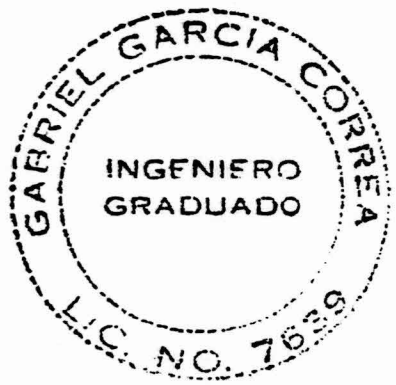
B. CALCULATIONS

Volume

Vt = (Lt)(Wt) (H)
Vt = (98 ft) (38 ft) (2 ft)
Vt = 7,448 cu. ft.
Vr = 1/2 (Lr) (Wr) (H)
Vr = (1/2) (20 ft) (8 ft) (2 ft)
Vr = 160 cu. ft.
Vc = Vt - Vr
Vc = (7,448 - 160) cu. ft.
Vc = 7,288 cu. ft.

Capacity

Q = (Vc)(F)
Q = (7,288 cu. ft.) (7.49 gal/cu. ft.)
Q = 54,587 gals



D-1a(4): Removal of Liquids from Containment System (270.15(a)(5); 264.175(b)(5))

What is checked? - should read visual inspection of the containment area

As was mentioned in paragraph D-1a(3)(b), prior to depleting this containment area, is checked visually to determine if it shows any indication that a leak or spill has taken place in the area. To deplete the containment system, we follow the procedure stated in Section D-1b(4). In the case that there is no evidence of a spill or leak in the area, the water will be drained through the storm sewer system. If a spill has been experienced, the operator will notify the supervisor for the final disposition of the water.

explain procedure if spill is evident.

D-1b: Containers Without Free Liquids

D-1b(1): Test for Free Liquids (270.15(b)(1))

The solids waste that are stored in containers come either from tank cleaning activities or from manufacturing processes. In both cases Mayaguez Plant is the generator and preventive measures are taken to eliminate the presence of free liquids.

1) All liquid is removed prior to storing the material in drums.
2) Some adsorbent material is added to the bottom of the drum to adsorb any liquid that could leach from the wet material.
3) All drums are well sealed with their lid to prevent that any liquid from precipitation could enter the drums.

D-1(b)(2): Description of Containers(40 CFR 264.171 and 264.172)

The hazardous waste storage area has a capacity to store 900 of the 55-gallon metal drums or 900 of the 57-gallon polyethylene drums or an equivalent volume. The containerized waste can be either liquid or solid. The solid hazardous wastes without free liquids stored in the hazardous waste storage area are destined for off-site disposal either at an approved hazardous waste landfill in Puerto Rico or in the United States. Liquid hazardous wastes are stored until the contents can be transfered to one of the hazardous waste storage tanks. All these wastes are stored in carbon steel drums which meet DOT Specifications 17C, E, or H; or they are stored in 57 gallon polyethylene drums made with a high density polyethylene material.

Compatibility of wastes with the steel drums or polyethylene drums is determined by Technical Services on a case-by-case basis. Technical Services will use waste analyses, information from literature, and experience with similar wastes to select the approved drum which is compatible with the waste materials.

All hazardous waste drums are labeled by the generating department with a hazardous waste sticker as required by Regulation 40 CFR 262. The labels remain on the drums through final disposition. These labels are the official identification of waste materials contained in the drums.

D-1(b)(3): Container Management Practices (40 CFR 264.173)

The container management practices for hazardous wastes without free liquids are similar to those practices for wastes with free liquids described in Section D-1a(2).

D-1(b)(4): Container Storage Area Drainage
(40 CFR 122.25(b)(1)(ii)(B) and 264.175(c))

The hazardous waste storage area is open and subject to precipitation. All precipitation that falls within the boundaries of the hazardous waste storage area is contained and collected. In addition, any leaks or spills are collected in the same containment system. The procedure to drain the containment system is the following:

1. A visual inspection of the area is done. If everything looks normal, that is, no leaks, no odors, no color is present, the inspector will check the pH value of the liquid. If the pH is between 6 and 9, the liquid is drained to the storm sewer system.
2. If some abnormal condition is observed, such as a leak, odor in the water or some color or if the pH does not fall within the specified limits, the following procedure is used:
    a. A sample is taken to assay Chemical Oxygen Demand (COD). If the value is above 100 ppm the water is contaminated.

b. We try to identify the source of contamination.

c. If solvent concentration is below 20,000 ppm of COD and the material does not appear in Appendix VIII of Part 261, the water will be routed to the Waste Treatment Plant.

d. If the condition of (c) above is not met, then, the water is collected in drums or tanks depending on the volume of water contaminated.

e. If the contaminated water does not contain heavy metals or contains them in concentrations below 30 ppm, the contaminated water is treated in our liquid incinerator.

f. If the concentration of heavy metals in the liquid is above 30 ppm, the waste is collected in containers and is treated and disposed in an approved off site facility.

As an additional control, all containers are stored on pallets to minimize contact with any liquids that might be on the floor of the storage area due to precipation, leaks, or spills.

All waste is stored in the same containment system, but is segregated according with its chemical and physical characteristics. Ignitable waste is stored under a roof area, corrosive waste is stored close to the drainage valve to prevent excesive contact between acid waste and the base of the containment system. Waste without free liquid is stored at the north side of

the containment system.

D-2: Tanks (40 CFR 122.25(b)(2))

D-2a: Description of Tanks (270.16(b); 264.19)

Eli Lilly Industries Mayaguez Plant stores hazardous liquid wastes for incineration in two separate tank systems. In the Tank Farm area, there are five storage tanks. The tanks are installed and operated in a manner consistent with good tank management practices. All tanks are accessible for regular inspection and maintenance, and surveillance of the tank storage areas is performed on a continuous basis by operators located in the immediate area. The tanks are assigned for primary and secondary waste storage.

All tanks have been designed with allowances which provide continuing assurance of structural integrity during all operations. Table D2-1 summarizes applicable design information for the tanks. All hazardous waste storage tanks are maintained at atmospheric pressure. Design pressure ratings and shell thicknesses exceeding minimum requirements provide operator margin to assure that tanks will not collapse or rupture.

Figure D-2 shows a diagram of the piping, instrumentation and process flow pattern.

D-2(b): Tank Corrosion and Erosion (122.75(b)(2)(ii); 264.192(a))

Liquid wastes generated from manufacturing processes at Mayaguez are developed to be compatible with storage tank materials of construction. Analysis of waste, as described in Section C-2 is conducted to assure that wastes remain compatible. Tank linings or coatings are not required and treatment reagents are not necessary to assure that the wastes stored will not corrode or erode tank internal surfaces.

Operating experience has demonstrated that mild carbon steel is compatible with all hazardous liquid wastes generated and stored in tanks at Mayaguez. Prior to transfer of hazardous liquid wastes into storage tanks, the pH of waste streams requiring neutralization is measured by each generating department, and neutralizing materials are added, as required. On a regular basis, the pH of secondary waste in the storage tanks is taken to verify that the waste has been properly neutralized. During storage, the pH of secondary waste is maintained between 4 and 12 to prevent tank corrosion. Hazardous wastes stored at Mayaguez contain solvents which are compatible when mixed in any proportion. Other than the pH checks discussed above, no other procedures are necessary to assure that hazardous liquid wastes generated by each department will be compatible with the storage tanks. At least once every year, each tank is inspected for localized and general corrosion. Based on inspections performed in the past, localized corrosion in the form of pitting and galvanic corrosion is far more

likely than general corrosion. The tanks are inspected with an ultrasonic detector. Minimum thicknesses are verified using this device, at multiple points on each tank. At least four points are tested at right angles at the upper section of the tank (weakest part of the tank 1/4" thick) and four points at right angles close to the bottom of the tank, where the maximum pressure is exerted by the liquid. Visual inspection of tank internal surfaces is the best method for detecting localized corrosion. When required, localized repairs have been accomplished considerably in advance of the time when a significant leak or tank failure was likely. These inspections, which are conducted for each tank at least once every year provide continuing assurance that tanks storing hazardous liquid wastes remain in good condition and in compliance with design standards.

D-2(c): Tank Management Practices (122.25(b)(2)(iv); 122.15(b)(2)(v), 264.192(b))

Controls are provided to prevent inadvertent overfilling of hazardous liquid waste storage tanks. Tanks which receive materials directly from manufacturing processes are equipped with piping at the top of the tanks which will divert waste to an adjacent tank to prevent overfilling. Since all wastes stored are compatible, transfers from one tank to another will not result in mixing of incompatible wastes. Tank levels of all hazardous waste storage tanks are measured at three levels, continuously. Pump controls are easily accessible to provide piping instrumentation

and flow for a typical hazardous waste storage tank for each of the two storage systems at Mayaguez Plant. Tank instrumentation consists of an automatic level indicator installed in the control room of the waste treatment plant. Flame arrestors are installed in the vents of all tanks to eliminate the possibility of explosion. All tanks are also grounded to provide protection from lighting.

A diagram of the storage tanks and other details is provided in Figure D-2.

D-3: Waste Piles

This section is not applicable to our facility.

D-4: Surface Impoundments

This section is not applicable to our facility.

D-5: Incinerator

D-5b: Trial Burn

D-5b(1): New Incinerator Start-up/Shake down (122.17(b)(1))

This section is not applicable to our facility.

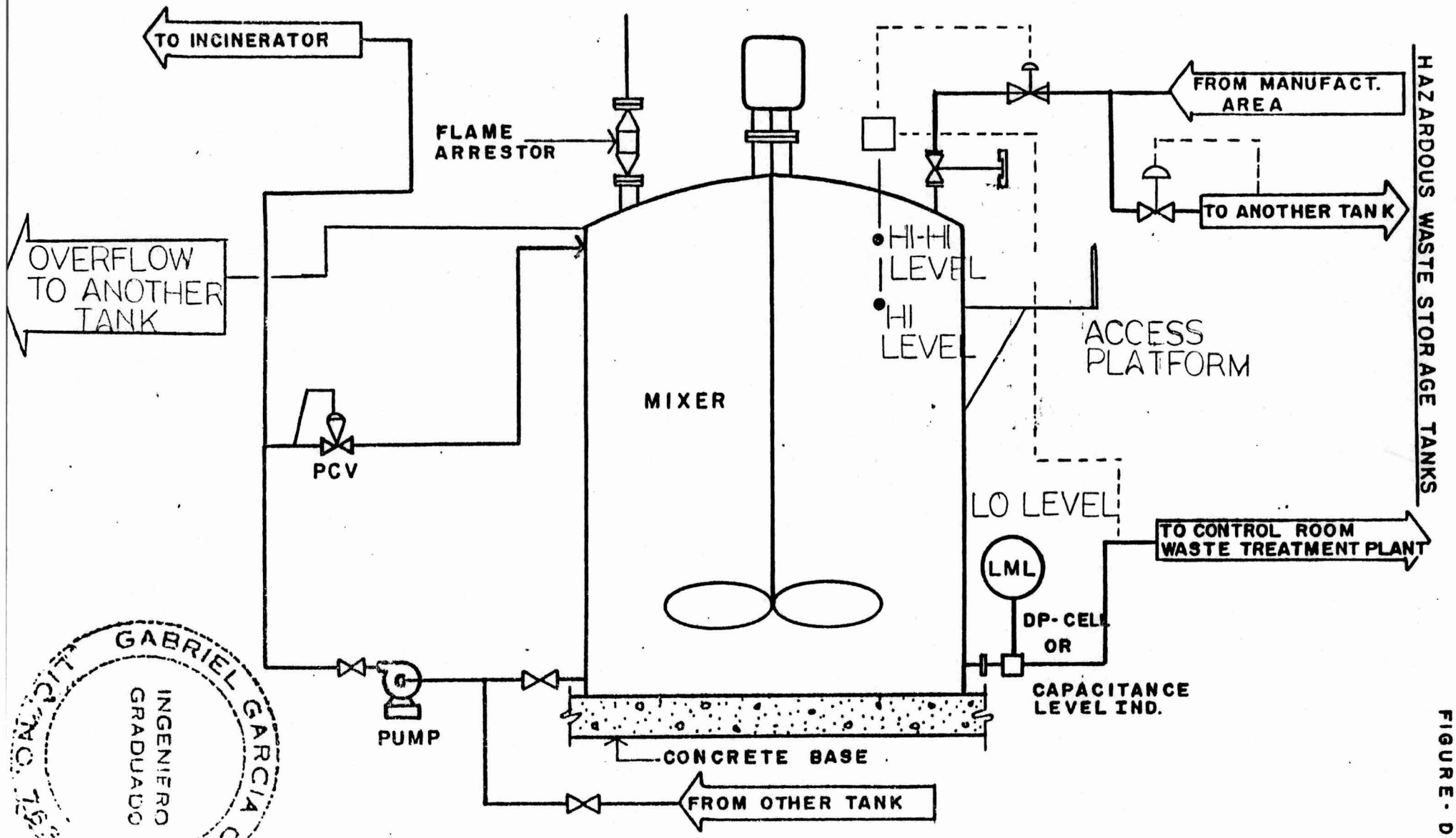


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FIGURE- D-2

D-5b(2): Trial Burn Plan (122.27(b)(ii); 122.27(b)(4))

D-5b(2)(a): Detailed Engineering Description Of Incinerators

A hazardous waste incinerator is located and operated at Mayaguez Plant. This unit is identified and referred to as the "thermal oxidizer" by Eli Lilly Industries. Detailed description of the features of each unit are identified below:

1. Manufacturer name: The Thermal Oxidizer is a custom built unit manufactured by Brule Corporation. The model of this unit is a 90-LV.

2. Type of Incinerator: The Thermal Oxidizer is composed of horizontal, refractory lined vessels designed for incineration of primary and secondary wastes. This incinerator has a high intensity burner section where primary wastes are introduced along with secondary wastes.

3. Linear dimensions: Table D5-1 provides major incinerator dimensions. These dimensions and other major dimensions and incinerator components for the incinerator are included on the attached location and dimensional schematic drawing.

TABLE D2-1

Design Information for Hazardous Liquid Waste Storage Tanks

ITEM	VERTICAL MOUNTED	VERTICAL MOUNTED
No. tanks	2	3
Type of material stored	Primary Waste	Secondary Waste
Working Volume (gals.)	11,000	11,000
Diameter	11'	11'
Straight Side length	18'	18'
Maximum Height of liquid level	17'	17'
Shell thickness	5/16" First course	5/16"x8'0" first course
Maximum Average Specific Gravity	1.20	1.10
Material of Construction	A-283 or Carbon steel	A-283 or Carbon steel
Type/Specification or Seams	Full penetration Double butt weld	Full penetration Double butt weld
Operating Pressure	Atmospheric	Atmospheric
Pressure Control	Conservation Vent to atmosphere	Conservation Vent to atmosphere
Operating Temperature	Ambient (80-90F)	Ambient (80-90F)
Supporting Structure	Mounted in armored concrete	Mounted in armored concrete
Design Standard	API 650	API 650
1/ea. Constructed	(2) 1985	(2) 1985 (1) 1974

4. Description of auxiliary fuel systems: The thermal oxidizer utilizes auxiliary fuel to raise and maintain operating temperature in the combustion zone. This incinerator has the capability to use kerosene as auxiliary fuel.

   The kerosene is introduced in a manner which does not interfere with primary waste injection. Control and safety shut down of auxiliary fuel flow is provided.

5. Prime mover capacity and type: The thermal oxidizers are equipped with two forced draft blowers and combustion blowers). The outrigger blower has a nominal flow capacity of about 5,000 CFM, while the combustion blower has a flow capacity of about 2,000 CFM. At a sufficient combustion, air is fed to the thermal oxidizer to maintain carbon monoxide concentrations in stack exhaust below established levels. If a leak developes, waste feed to the incinerator is immediately cutoff and the incinerator is brought to a safe shutdown condition until repairs are completed. The incinerator system operates at positive pressure up to the scrubber unit, therefore, any leak up this section is readily visible to be identified and corrected. After the scrubber unit, the system works at negative pressure. All components after the scrubber section are constructed in FRP, so

the joints and corrections in this material are easy to keep tight and sealed. This integral material will not allow for minor leaks, in the event of a leak it should be due to a rupture or failure of the material, so it will be readily identified.

6. Description of automatic waste feed cut-off system. The control system of the incinerator will include automatic controls to cut off the feed of hazardous liquid waste when operating conditions are outside of limits necessary to comply with permit conditions. Table D5-2 lists specific conditions which will cause automatic cut off of waste feed to the incinerator. The cut off of waste feed, if required will be accomplished through the operating control panel by deactivating a selenoid valve which supplies air to the waste feed valves. This will release the spring closure mechanism in the waste valves, and drive the valves to the shut off position. The conditions set in Table D5-2 are conditions previously established by incinerator experience but conditions could be changed when the trial burn is performed in the unit.

Two of the conditions listed in Table D5-2, high carbon monoxide level in the stack exhaust gas and low combustion zone temperature, are critical to assure that incinerator performance remains within permit

conditions. The carbon monoxide analyzer for the incinerator is a Rosemount Model 5100 in-situ device, or equivalent. The infrared sensor installed in this instrument is connected to a self diagnostic microprocessor which facilitates maintenance and troubleshooting of the system. This instrument includes a hermetically sealed cell containing a carbon monoxide standard, and a daily calibration is performed using this cell.

Combustion zone temperature sensors are thermocuples which are sheathed in a ceramic material. The thermocouples are installed in the combustion zone and wired into the control panel. Loss of the thermocouple or any combustion zone temperarture below 1800 F, will result in activation of the emergency waste feed cutoff system. Checks are made routinely according to the inspection schedule by a qualified instrument techician to assure continuing calibration.

Waste feed cutoff systems for other parameters listed in Table D5-2 are checked routinely according to the inspection schedule to assure activation at the proper setpoints. For these checks, waste feed will be discontinued and auxiliary fuel will be used to maintain the temperature in the combustion chamber. The checks will consist of signal inputs to the control